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(54) PERMANENT MAGNET PROPULSION SYSTEM

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(57) **ABSTRACT**

This invention is a propulsion system for a train that uses permanent magnets mounted on a rotating iron cylindrical plate carrying a radial current in order to create a spacetime curvature distortion which pulls the locomotive along the track.

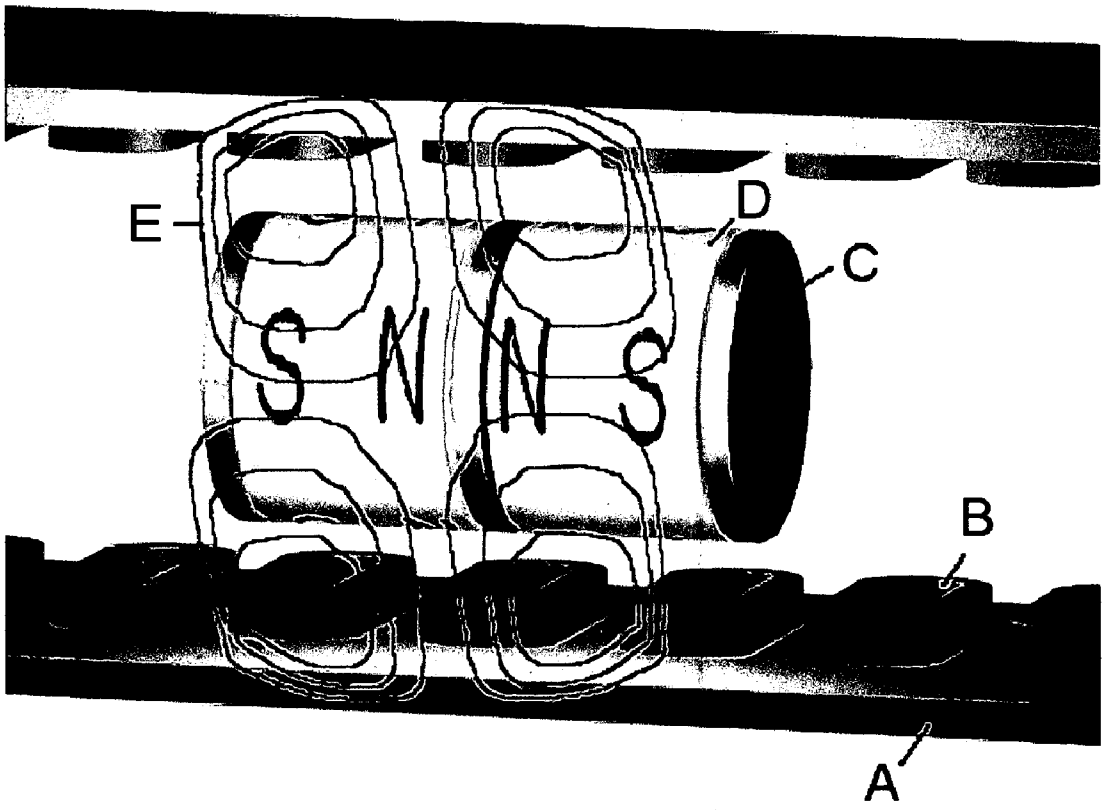


Figure 1

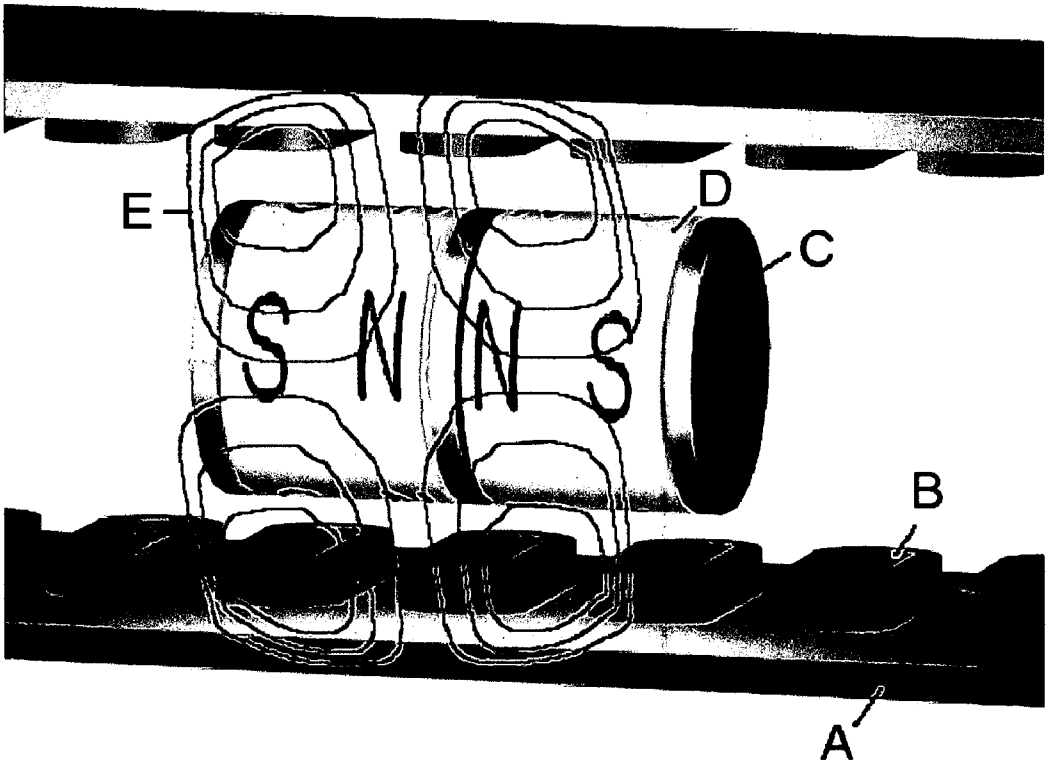


Figure 2

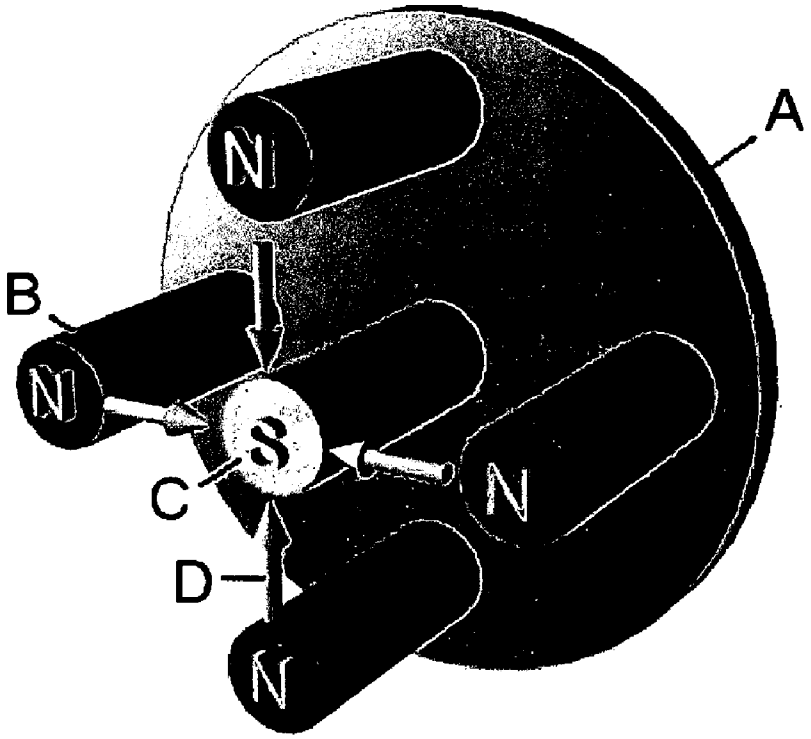


Figure 3

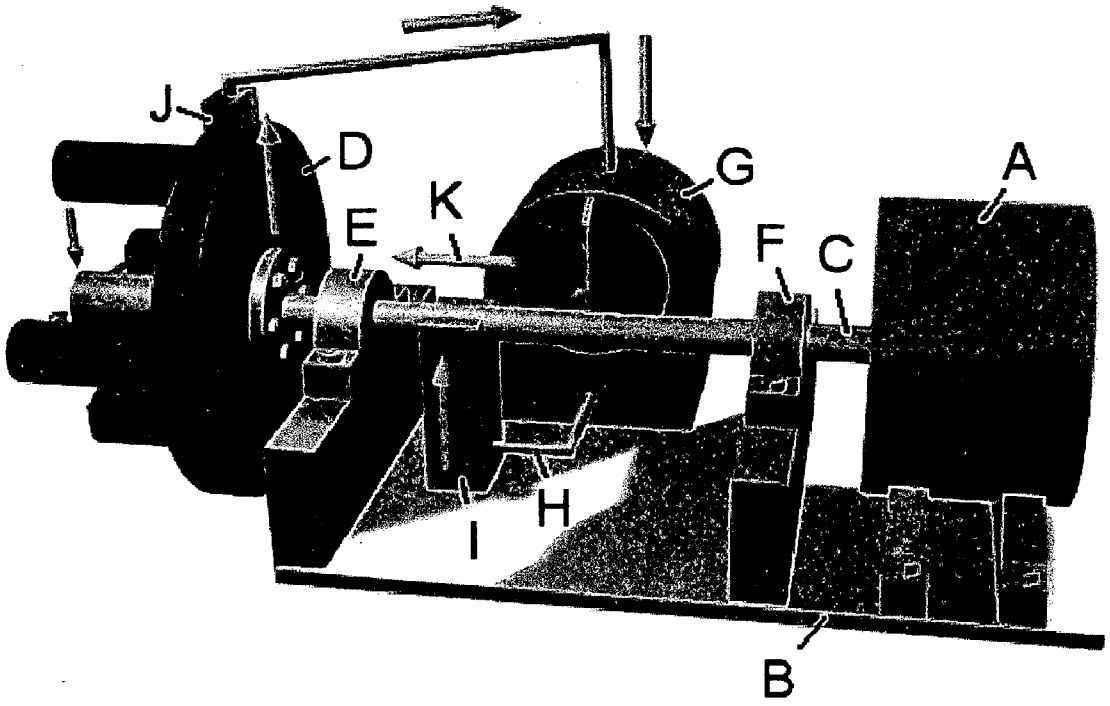
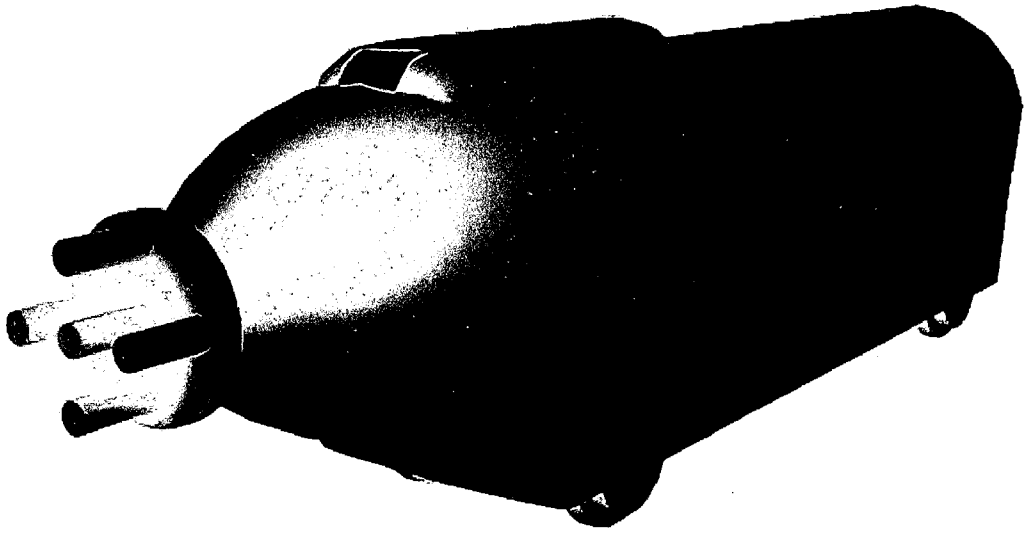


Figure 4



PERMANENT MAGNET PROPULSION SYSTEM

BRIEF SUMMARY OF THE INVENTION

[0001] This invention is a propulsion system for a train that utilizes spinning cylindrical magnets in order to create a spacetime pressure distortion ahead of the vehicle that pulls the locomotive along the track.

BACKGROUND OF THE INVENTION

[0002] At the present time, referring to **FIG. 1**, proposed permanent magnet propulsion systems use a dual railway track (A) supporting a series of coil windings (B) located along the track. The vehicle is attached to two permanent magnets (D) between steel pole pieces (C). The north pole of each magnet faces the interior pole piece such that the magnetic flux path (E) follows the center pole piece up through the railway bed and then back to the south pole of the magnet. As the magnets move along the track, the coil windings are activated at the correct time by Hall sensors. With the coil energized as a north pole, the permanent magnet north pole is repelled which drives the vehicle along the track The problem with this design, and other similar designs, is that it is not practical to wind huge numbers of sensor-activated electrical coils along a steel track.

[0003] From Einstein's General Theory of Relativity, it is known that a spacetime curvature pressure develops perpendicular to direction of vibration of the electric and magnetic field. As an example, the photon has an electric field vibrating in the vertical y-direction and a magnetic field vibrating in the horizontal x-direction. The spacetime curvature pressure is therefore along the z-axis of radiation which pushes the negative mass of the photon along. Thus in order to create a spacetime curvature pressure in the z-direction along the track which would pull the train forward, a magnetic flux density field is required in the radial direction.

[0004] Referring to **FIG. 2**, four equally-spaced north permanent magnets (B) surrounding a centrally-located south permanent magnet (C) are mounted on an iron cylinder which acts as the radial flux return path. The magnetic flux density field (D) is in the radial direction from the north pole to the south pole. In order to provide strength, the magnets are molded onto a steel shaft and coated with epoxy so that they don't rust. During the molding process, a capacitor-discharge magnetizer is used to create the magnetic field of the magnet.

[0005] In Cartesian coordinates {−ct,x,y,z}, the elemental spacetime length ds squared is the sum of the squares of the incremental lengths {cdt,dx,dy,dz}

$$(ds)^2=-(dt)^2+(dx)^2+(dy)^2+(dz)^2$$

where the speed of light c is unity. The coefficients (−1,1,1,1) of this equation make up the g metric 4×4 tensor

$$g_{\alpha\beta}=\begin{array}{c|cccc} & t & x & y & z \\ t & -1 & 0 & 0 & 0 \\ x & 0 & 1 & 0 & 0 \\ y & 0 & 0 & 1 & 0 \\ z & 0 & 0 & 0 & 1 \end{array}$$

[0006] The Faraday electromagnetic tensor contains the magnetic fields which determine how the spacetime length ds is curved. For a magnetic flux density field in the x-direction, Bx, and a magnetic flux density field in the y-direction, By, the Faraday tensor is

$$F^{\alpha}_{\beta}=\begin{array}{c|cccc} & t & x & y & z \\ t & 0 & 0 & 0 & 0 \\ x & 0 & 0 & 0 & -By \\ y & 0 & 0 & 0 & Bx \\ z & 0 & By & -Bx & 0 \end{array}$$

The stress-energy-momentum tensor T, which determines how space is curved, is calculated from the following equation

$$4\pi T^{\mu\nu}=F^{\mu\alpha}F^{\nu}_{\alpha}-\frac{1}{4}g^{\mu\nu}F_{\alpha\beta}F^{\alpha\beta}$$

The stress-energy in the z-direction ahead of the locomotive is

$$T^{zz}=\frac{B_x^2+B_y^2}{8\pi}=\frac{B_r^2}{8\pi}$$

where the sum of the squares of the fields in the x and y directions is the radial B field. In Einstein's General Relativity Theory, the curvature G tensor is equal to the stress-energy tensor divided by 8π. The G tensor is the curvature of space having units of inverse radius squared.

$$G=\frac{T}{8\pi}$$

Therefore the curvature G_{zz} generated along the z-direction ahead of the train is proportional to the square of the magnetic flux density field

$$G_{zz}=\frac{1}{r^2}=\frac{G\varepsilon}{c^2}\frac{B_r^2}{8\pi}=\frac{1}{meter^2}$$

where G is Newton's gravitational constant (not to be confused with the curvature tensor), ϵ is the linear capacitance of space, and c is the speed of light. The linear mass of space Ω is the speed of light c squared divided by the gravitational constant G, so that the equation can be written as

$$\frac{G\varepsilon}{c^2}\frac{B_r^2}{8\pi}=\frac{\varepsilon}{\Omega}\frac{B_r^2}{8\pi}=\frac{1}{\frac{\Omega}{\varepsilon}}\frac{B_r^2}{8\pi}$$

where the conversion factor is the square of the magnetic vector potential A

$$\sqrt{\frac{\Omega}{\varepsilon}} = \frac{\text{kgm}}{seccoul} = A$$

which is actually the momentum per charge. Therefore the curvature equation can be written as

$$\frac{1}{r^2} = \frac{1}{8\pi}\left(\frac{B_r}{A}\right)^2$$

This equation shows that it is necessary to create a magnetic vector potential together with the radial magnetic flux density field in order to create a curvature of space. Looking at the units of A shows that it is a mass momentum per charge

$$A = \frac{\text{kg}}{sec}\frac{m}{coul} = \frac{m\omega^2 r}{I}$$

or a mass m rotating with angular velocity c) per current along the radius. In terms of the invention, what this means is that the mass of the iron cylinder has to be rotating and there has to be a radial electrical current I in order to produce the linear charge along the radius. The differential mass dm depends on the circumference times the differential radius dr, the mass density p, and the length L of the cylinder

$$dm=\rho 2\pi rLdr$$

so that the magnetic vector potential becomes

$$A = \int_0^R \frac{\rho 2\pi rL\omega^2 r}{I} dr = \frac{2}{3}R^3\rho\pi L\frac{\omega^2}{I}$$

The value of A for the iron cylinder is

$$L = .2m$$

$$\rho = 7866\frac{kg}{m^3}$$

$$R = 1m$$

$$\omega = 2\pi f = 6.28\ \text{sec}^{-1}$$

$$I = 3000000\ \text{amp}$$

$$A = .04335\frac{kgm}{\text{sec}coul}$$

$$Br = 1.2tesla$$

$$\frac{1}{8\pi}\left(\frac{Br}{A}\right)^2 = 30.47m^2$$

$$r_{curvature} = \sqrt{8\pi}\left(\frac{A}{Br}\right) = .181m$$

What makes this possible is that the new N-machines can easily generate a minimum of 6 million amps which is twice the value of the electrical current above.

[0007] Referring to **FIG. 3**, the assembly consists of a large induction motor (A) mounted on the train's base plate (B) driving a motor shaft (C) attached to the iron cylinder (D). The shaft is held in place by two thrust bearings mounted in two pillow blocks (E,F). The current-generating N-machine (G) is electrically connected by a copper bus (H) to a copper-beryllium brush (I) on the motor shaft with a similar return brush (J) on the edge of the iron cylinder. The current (K) flows through the motor shaft to the center of the rotating cylinder and then radially outward to the edge. The magnetic flux density flows from the north poles of the outer permanent magnets to the central south pole, along the central magnet to the center of the rotating cylinder and then radially outward to the south poles of the outer magnets.

[0008] The thrust F developed is the radius of curvature of spacetime r_c calculated above times the magnet flux density field times the current I

$$F = \frac{r_c B_r I}{\sqrt{8\pi}} \approx 30000lbf$$

Using conservation of tensor coordinates, the radius of curvature is in the z-direction, the magnetic flux density field is in the radial direction and the current is in the radial direction

$$F^z = x^z B_r I^r$$

where the radial indices cancel, leaving the z-index as the direction of the force.

SUMMARY OF THE INVENTION

[0009] It is the object of this invention to create a spacetime curvature in front of a train locomotive in order to pull the vehicle along the track It is known from gravitational physics that a spacetime curvature is generated perpendicular to the direction of vibration of the electric and magnetic field. A radial magnetic field, which can be produced by permanent magnets attached to the flat faces near the rim of a iron cylinder rotating about the z-axis, will create a curvature in the z-direction. Four cylindrical north-pole-oriented magnets produce a radial magnetic flux density with is channeled into a central cylindrical south-pole-oriented magnet. The flux lines then flow radially outward through the steel rotating cylinder and reconnect with the south poles of the four outer magnets. The rotating iron cylinder generates the equivalent of a magnetic vector potential when an electrical current flows from the center of the cylinder to the edge. This current is generated by an N-machine current generator. The square of the magnetic flux density divided by the magnetic vector potential is equal to the spacetime curvature. The square root of the inverse of the spacetime curvature is the radius of curvature. The thrust developed is this radius of curvature times the magnetic flux density field times the current.

A BRIEF DESCRIPTION OF THE DRAWINGS

[0010] **FIG. 1**. Perspective view of proposed permanent magnetic propulsion system using coil windings on the steel track.

[0011] **FIG. 2**. Perspective view of permanent magnet rotor assembly.

[0012] **FIG. 3**. Perspective view of system showing motor drive, N-machine and permanent magnet rotor.

[0013] **FIG. 4**. Perspective view of locomotive and rotor/magnet assembly.

DETAILED DESCRIPTION OF THE INVENTION

[0014] 1. The permanent magnets are made of neodymium-iron-boron material which is heated to its melt temperature and injection molded around a steel shaft threaded at one end while at the same time a pulsed magnetic field is applied to the material using a charge-discharge magnetizer. Because of the iron in the material, a coat of epoxy is applied to the magnet in order to protect it from the environment. Holes are drilled into the iron plate 90° apart near the rim, threaded, and then the steel shaft with the magnet is then inserted. Another hole is drilled and tapped in the center of the circular plate for attaching the south pole magnet which is used as the return path for the magnetic flux.

[0015] 2. Another easier way to make the magnets is to purchase short lengths of tubular NdFeB magnets and then stack them on the steel shaft with a cylindrical iron pole piece on the end of the shaft. The pole piece then holds the magnets down in place when the shaft is threaded into the plate.

[0016] 3. Referring to **FIG. 4**, the propulsion system is mounted inside the train cabin such that the rotor/magnet assembly extends out in front of the locomotive where the spacetime curvature is generated.

I claim:

1. A train propulsion system consisting of the following components:

a. a rotating iron cylindrical plate rotor of high relative permeability driven by an induction motor and horizontal steel motor shaft mounted in pillow block thrust bearings;

b. four cylindrical magnets, each molded to a steel support shaft threaded into the iron plate at 90° intervals around the rim of the plate with their north poles facing away from the plate;

c. a fifth cylindrical magnet molded to a steel support shaft which is threaded into the center of the iron plate with the south pole facing away from the plate;

d. an N-machine current generator supplying a radial electrical current from the center of the rotating plate by means of a copper-beryllium brush on the motor shaft (**1***a*) and another similar brush on the outside edge of the rotor.

e. a locomotive train on which the components are mounted such that the rotor/magnet assembly extends out in front of the locomotive with the rotor's angular velocity vector pointing along the track.

2. a closed magnetic flux path along a radial path in air from the north poles of the four outer magnets (**1***b*) to the south pole of the central magnet (**1***c*), through the center magnet and then radially outward through the rotor (**1***a*), returning back through the four outer magnets, such that the flux and electrical current (**1***d*) flow in the same outward radial direction through the rotor.

3. the creation of a spacetime curvature due to claims (**1***a* through **2**) that produces a large force on the locomotive equal to the radius of the spacetime curvature times the flux times the current.

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